

PATENT

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A PROGRAMMABLE SNACK DISPENSER AND METHOD

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Background of the Invention

(1) Field of the Invention

This invention pertains to the field of vending machines.

15 More particularly, this invention pertains to the field of
payment acceptance apparatus for snack dispensers.

(2) Background

The use of credit or debit card acceptance systems in
connection with vending machines, such as snack or beverage
20 dispensers, is known. In many cases, such vending machines
comprise an expensive card acceptance system of the type that
accepts common third party credit or debit cards. Such, credit
card systems typically require components capable of accessing

an external or remote central database that stores card holder personal information, financial history, and available credit information for purposes of authenticating or validating payment. The components necessary for retrieving this
5 information are relatively expensive.

Other card or key reading devices utilized in connection with vending machines rely solely on the information provided on the cards or keys associated therewith to determine payment information. While relatively less expensive, such systems lack
10 any means of authenticating or validating payment information. Additionally, such systems typically require the card reading device to be able to alter the information stored on a swiped card so as to alter the balance value stored thereon.

15 Summary of the Invention

The present invention provides a way for a vending device equipped with a card or key reading device to validate information associated with a particular key code and to complete the sale without accessing an external database or
20 central computer. Moreover, the present invention allows such a vending device to alter and store information associated with particular key codes without writing or otherwise altering the

information on external cards or key devices. These features allow vending devices in accordance with the invention to be relatively inexpensive to produce, without sacrificing the advantageous features provided by the use of credit or debit
5 cards.

In a first aspect of the invention, a programmable snack dispenser in accordance with the invention comprises a snack dispenser apparatus, an input receiving mechanism, and an electronic storage apparatus. The snack dispenser apparatus is
10 adapted to contain a plurality of snack items and is adapted and configured to be altered between a snack inaccessible condition and a snack accessible condition. In the snack inaccessible condition, the snack dispenser apparatus resists access to the snack items. In the snack accessible condition, the snack
15 dispenser apparatus facilitate access to at least one of the snack items. The input receiving mechanism is operatively connected to the snack dispenser apparatus and is adapted to enable a user to input identification information into the input receiving mechanism. The electronic storage apparatus is
20 connected to the snack dispenser apparatus and is in communication with the input receiving mechanism. Additionally, the electronic storage apparatus is adapted and configured for

storage of credit information indicative of a credit amount associated with the identification information. The snack dispenser apparatus is also adapted and configured to alter the snack dispenser apparatus from the snack inaccessible condition to the snack accessible condition upon a user inputting the identification information into the input receiving mechanism and the credit information equaling or exceeding a predetermined value.

In another aspect of the invention, a method in accordance with the invention comprises a step of providing a vending key to a user. The vending key includes electronically readable identification information relating to the user. This method further comprises a step of providing a programmable snack dispenser that includes a key reader adapted to read the identification information on the vending key. Additionally, this method includes a step of programming the snack dispenser with credit information associated with the vending key. Still further, this method comprises a step of configuring the snack dispenser such that, when the user positions the vending key relative to the key reader in a manner to enable the vending key to be read by the key reader, the programmable snack dispenser determines whether the credit information is sufficient to

warrant dispensing of a snack from the snack dispenser.

In yet another aspect of the invention, a method comprises a step of accessing a snack dispenser having a key reader adapted to read a vending key. The snack dispenser is adapted to determine whether to permit vending of a snack item from the snack dispenser by comparing information on the vending key to information which is stored in the snack dispenser and associated with the vending key. The method further comprises a step of placing the vending key adjacent the key reader in a manner to enable the snack dispenser to vend the snack item.

In yet another aspect of the invention, a snack dispensing method comprises a step of providing first and second vending keys. The first key has electronically-readable first identification information stored thereon and the second key has electronically-readable second identification information stored thereon. The second identification information is different than the first identification information. The method also comprises a step of providing a programmable snack dispenser. The snack dispenser includes a key reader that is adapted to read the first identification information stored on the first key when the first key is positioned in communication with the key reader. The key reader is also adapted to read the second

identification information stored on the second key when the second key is positioned in communication with the key reader. The snack dispenser contains a plurality of snack items and is alterable between a snack inaccessible condition and a snack accessible condition. In the snack inaccessible condition, the snack dispenser resists access to the snack items. In contrast, in the snack accessible condition, the snack dispenser facilitates access to at least one of the snack items. The snack dispenser further comprises an electronic storage apparatus that is adapted and configured for storage of first credit information and second credit information. The first credit information is indicative of a credit amount associated with the first key, and the second credit information is indicative of a credit value associated with the second key. The snack dispenser is also adapted and configured to alter the snack dispenser from the snack inaccessible condition to the snack accessible condition upon the key reader reading the first identification information and the first credit information equaling or exceeding a predetermined value. The snack dispenser is further adapted and configured to alter the snack dispenser from the snack inaccessible condition to the snack accessible condition upon the key reader reading the second

identification information and the second credit information
equaling or exceeding a predetermined value. The method further
comprises steps of storing the first credit information in the
snack dispenser, and storing the second credit information in
5 the snack dispenser.

While the principal advantages and features of the
invention have been described above, a more complete and
thorough understanding of the invention may be obtained by
referring to the drawings and the detailed description of the
10 preferred embodiment, which follow.

Brief Description of the Drawings

Figure 1 is perspective view of the preferred embodiment of
a snack dispenser in accordance with the invention.

15 Figure 2 is a flowchart of the operation of the preferred
embodiment of the payment acceptance and dispensing system
utilized in connection with the snack dispenser shown in Figure
1.

Reference characters in the written specification indicate
20 corresponding items shown throughout the drawing figures.

Detailed Description of the Preferred Embodiment of the
Invention

The preferred embodiment of a vending device in accordance with the invention is a snack dispenser, as shown in Figure 1.

5 Aside from the novel features hereinafter described, the snack dispenser 10 is preferably a portable carousel style snack dispenser of the type well known in the vending industry.

In general, the snack dispenser 10 comprises an outer body 12 and internal carousel 14. The carousel 14 is configured and adapted to rotate about a vertical axis within the outer body 12 and comprises a plurality of compartments 16 that are adapted and configured to store and separate various snack items. The outer body 12 is preferably at least partially transparent and comprises several selectively openable doors 18 that provide
10 limited access to the compartments 16 of the carousel 14 for the purpose of manually retrieving purchased snack items from the snack dispenser 10. The doors 18 are preferably selectively lockable in a closed position by a plurality of electronically actuated solenoids (not shown). The snack dispenser 10 also
15 comprises an electric motor (not shown) for driving the rotation of the carousel 14 within the outer body 12. A pair of manually actuated switches 20 are connected to the drive motor and allow
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consumers to rotate the carousel 14 in either of opposite rotational directions. By rotating the carousel 14, each of the compartments 16 can be aligned with and accessed through one of the doors 18 provided on the outer body 12.

5 The snack dispenser 10 also comprises a payment acceptance and dispensing system that comprises an input device or a key reader 22, a display device 24, and a currency acceptance device 26. The key reader 22 and the display device 24 are preferably off-the-shelf components of the type commonly available and are
10 operatively connected to each other via an electronic control circuit (not shown). Similarly, the currency acceptance device 26 is operatively connected to the key reader 22 and the display device 24 via the electronic circuit and is specifically adapted to be fitted within the outer body 12 of the snack dispenser 10
15 using well known existing technology. The payment acceptance and dispensing system controls the solenoids that selectively lock the doors 18 of the snack dispenser 10.

 The key reader 22 of the payment acceptance and dispensing system is preferably a standard card reader of the type
20 configured and adapted to read high-coercivity or low-coercivity, single track magnetic cards that comply with ISO 7811 standards. However, the key reader 22 could alternatively

be configured and adapted to read other types of cards or other types of keys. For example, the key reader could comprise a number pad for manually entering personal identification numbers, or could be a biometric reader device or a reader
5 device adapted to read from portable digital storage apparatus such as smart cards.

The display device 24 of the payment acceptance and dispensing system is preferably a liquid crystal display device of either a backlit or non-backlit type. However, it should be
10 appreciated that various types of display devices, such as light emitting diode displays, are suitable alternatives.

The currency acceptance device 26 of the payment acceptance and dispensing system is preferably a coin acceptance device of the type configured and adapted accept coin currency and to
15 determine the value of such coin currency deposited. For purposes of minimizing the cost of the snack dispenser 10, the currency acceptance device 26 is preferably not of the type configured to provide change. However, in situations where change return is desirable, a currency acceptance device with a
20 change return feature could be utilized. Additionally, a currency acceptance device configured to accept paper currency could also be utilized.

The electronic control circuit of the payment acceptance and dispensing system preferably comprises a standard rewritable storage apparatus such as an electronic memory chip (not shown). Additionally, the control circuit comprises a processor that is
5 adapted and configured control the operation of the payment acceptance and dispensing system and that is preferably programable.

In operation, the snack dispenser 10, if not currently being used by a consumer, normally is in a snack inaccessible
10 condition. In this snack inaccessible condition the doors 18 of the snack dispenser 10 are locked in their closed positions by the solenoids. As such, the snack items positioned in the compartments 16 of the carousel 14 of the snack dispenser 10 remain inaccessible from outside of the outer body 12 of the
15 snack dispenser.

During standby periods of non-use, the snack dispenser 10 remains in the snack inaccessible condition and the processor of the payment acceptance and dispensing system monitors the snack dispenser for indications that a consumer is attempting to
20 utilized the snack dispenser. When the snack dispenser 10 is utilized by a consumer, the processor of the payment acceptance and dispensing system operates in a manner generally shown in

the flowchart of Figure 2.

As shown at the top of the flowchart of Figure 2, during standby periods, a variable shown as the "total purchasing value" is assigned a value of zero by the payment acceptance and dispensing system. This variable represents the combined amount of purchasing value of deposited currency and credit value available to the consumer for purchasing snack items from the dispensing device 10. Additionally, during standby, no particular key code information is associated with the total purchasing value. The payment acceptance and dispensing system preferably makes no changes until a consumer that desires to purchase a snack item from the snack dispenser 10 performs any one of several actions. These actions include, but are not limited to, attempting to open any one of the doors 18, depositing currency into the currency acceptance device 26, or utilizing the key reader 22 to read a key provided by the consumer. When this occurs, a timer is preferably triggered by processor to begin monitoring the duration of time passing after the last action taken by the consumer. Additionally, in this "awake" mode, the payment acceptance and dispensing system displays the total purchasing value on the display device 24.

In the situation in which the payment acceptance and

dispensing system is awoken by a card being swiped or key being entered using the key reader 22, the processor retrieves identification information such as a unique key code read by the key reader. Once the processor has retrieve the identification
5 key code, it then accesses the storage apparatus and retrieves information associated with the particular key code from the storage apparatus. This information preferably includes a variable indicative of an amount of credit value associated with the particular key code and is represented in Figure 2 by the
10 variable "card value." As shown, this card value is then added to the total purchasing value (which is zero in this case) to determine a new total purchasing value. From this point, the payment acceptance and dispensing system continues to monitor the currency acceptance device 26 and the doors 18 to determine
15 what, if any, further action is taken by the consumer.

Assuming that the next step taken by the consumer is to attempt to open one of the doors 18 of the dispensing device 10, a triggering device associated with the respective door lets the payment acceptance and dispensing system be made aware of such
20 action. The processor then accesses the storage apparatus and retrieves information therefrom that is indicative of the cost of the snack item associated with the particular snack item in

compartment 16 of the carousel 14 that is adjacent the selected door 18. This value, shown as the selection cost in Figure 2, is then compared to the current total purchasing value. If the total purchasing value is greater than or equal to the selection cost, the payment acceptance and dispensing system energizes the solenoid associated with the respective door 18 in a manner unlocking the door. This allows the consumer to fully open the door 18 and remove the desired snack item 28 from the carousel 14. With the door 18 open, the snack dispenser 10 is in a snack accessible condition. It should be appreciated that when the snack dispenser 10 is in the snack accessible condition, the carousel 14 is prevented from rotating within the outer body 12 of the snack dispenser 10 such that only the selected compartment 16 can be accessed. Preferably, immediately upon the opening of the door 18, the processor subtracts the selection cost from the total purchasing value to determine a new total purchasing value. Additionally, preferably immediately after calculating the new total purchasing value, the processor instructs the storage apparatus to overwrite the card value stored in the storage apparatus for the particular key code with the newly calculated total purchasing value. This effectively charges the consumer for the snack item by reducing

the total purchasing value associated with his or her key code by the selection cost.

If the total purchasing value is less than the selection cost, the payment acceptance and dispensing system does not energize the solenoid associated with the respective door 18. Thus, the door 18 remains locked and the snack dispenser 10 remains in the snack inaccessible condition. However, when this occurs, the payment acceptance and dispensing system preferably displays the selection cost via the display device 24 in an effort to alert the consumer to the fact that there is insufficient total purchasing value to purchase the selected snack item at the present time.

In this later situation, the payment acceptance and dispensing system continues to monitor for the deposit of currency into the currency acceptance device 26. When currency is deposited into the currency acceptance device 26, the processor adds the value of the added currency to the total purchasing value. Thus, with sufficient currency added, the total purchasing value will eventually reach a value greater than or equal to the selection cost of the desired snack item and the consumer can then open the respective door 18. As described above, immediately upon the opening of the door 18,

the processor preferably subtracts the selection cost from the total purchasing value to determine a new total purchasing value. Additionally, the processor preferably thereafter instructs the storage apparatus to overwrite the card value stored in the storage apparatus for the particular key code with the newly calculated total purchasing value.

If a key code is read by the key reader 22 but no attempt to open a door 18 is made, the payment acceptance and dispensing system eventually times-out and returns to the standby mode. However, before timing out, the processor overwrites the card value stored in the storage apparatus for the particular key code with the total purchasing value. Thus, whenever a key code is read into the snack dispenser 10, the card value held in the storage apparatus that is associated with key code is overwritten with the total purchasing value held in processor, whether or not any of the doors of the snack dispenser are opened. As such, it should be appreciated that the card value stored in the storage apparatus for the particular key code will reflect the original card value prior to reading the key code, the purchases made by the consumer (if any), and the currency inserted into the snack dispenser (if any). Thus, a person can add to the card value of his or her key code by inserting

currency without making any purchase, or by inserting a value of currency in excess of the cost of purchased snack items.

If a key code is not entered into the snack device 10, but a consumer inserts currency into the currency acceptance device 5 26, the payment acceptance and dispensing system adds the value of the currency to the total purchasing value to determine a new total purchasing value and displays the new total purchasing value via the display device 24. Thus, in this situation, the total purchasing value will equal the value of the total 10 currency entered until a purchase is made or until a key card is read into the snack dispenser 10. If the consumer makes a snack selection by attempting to open one of the doors 18, the payment acceptance and dispensing system generally operates in the same manner as described above. However, until a key code has been 15 read into the snack dispenser 10, the payment acceptance and dispensing system will not overwrite any card value in the storage apparatus. Thus, amount of total purchasing value after a purchase has been made will be forfeited after the timeout period has elapsed. This will also occur if no purchase is 20 made. However, if a key code is entered at any time prior to the timeout period elapsing, the card value associated with the key code will be added to the total purchasing value to

determine a new total purchasing value and thereafter the relevant card value will be overwritten with the new total purchasing value as previously described.

It should also be appreciated that the snack dispenser 10 could be configured to timeout only after a key code has been read into the device. As such, any currency entered into the snack dispenser 10 would be reflected in the total purchasing value until either a key code was entered or until the selection cost of the last snack purchased equaled the total purchasing value.

If a consumer attempts to open one of the doors 18 of the snack dispenser 10, but has neither entered currency nor entered a key code into the snack dispenser, the payment acceptance and dispensing system will display the selection cost associated with the snack item adjacent the particular door 18 via the display device 24. Additionally, the payment acceptance and dispensing system preferably displays the total purchasing value via the display device 24, which in this situation has a value of zero. It should be appreciate that the payment acceptance and dispensing system does not energize the solenoid of the respective door 18 at this time and therefore that the snack dispenser 10 remains in its snack inaccessible condition. From

this point, the payment acceptance and dispensing system operates as previously described.

In addition to the features described above, the snack dispenser 10 of the preferred embodiment is also preferably provided with an input device (not shown) that is capable of receiving signals from an external device such as a handheld computer. Such signals could be wireless signals or hardwired signals. The input device is operatively connected to the payment acceptance and dispensing system and is configured and adapted to allow a person servicing the snack dispenser 10 to alter the information stored in the storage apparatus. For example, by utilizing a handheld device, a person servicing the snack dispenser 10 can alter the selection cost associated with each of the compartments 16 of the carousel 14. Additionally, such a person can also alter any of the stored card values associated with the stored key codes. Thus, if a consumer desires to add an amount of credit value to the card value associated with his or her key code, the consumer can provide the service person with the amount in currency and the service person can then adjust the stored card value associated with the consumer's key code accordingly. Preferably, the handheld device utilizes a DEX protocol which conforms to the National

Automatic Merchandisers Association data transfer standard
(EVA_DTS), Version 5.0.

In view of the foregoing, it should be appreciated that the preferred embodiment of a snack dispenser in accordance with the invention is capable of storing and associating numerous unique key codes and card values internally. Thus, snack dispensers in accordance with the invention are ideally suited for environments, such as workplace environments, where consumers repetitively utilize the same snack dispenser.

It should also be appreciated that, because the snack dispenser 10 of the preferred embodiment of the invention utilizes only relatively simplistic components, the snack dispenser is inexpensive to produce and can be sold at a relatively low price. Nonetheless, despite its simplistic components, the snack dispenser 10 of the preferred embodiment of the invention provides many of the desirable functions of more expensive snack dispensers. For example, by lacking a coin return device, the snack dispenser 10 of the preferred embodiment of the invention cost significantly less to produce than it would otherwise. Nonetheless, despite the lack of a coin return, consumers using the snack dispenser are provided change in the form of credit added to the card value stored in

the snack dispenser for their particular key code.

Additionally, by lacking a magnetic card writer, the snack dispenser 10 of the preferred embodiment of the invention cost significantly less to produce than it would otherwise. Yet, by
5 storing card values internally, the need for a card writing device is eliminated without jeopardizing functionality.

While the present invention has been described in reference to a specific embodiment, in light of the foregoing, it should be understood that all matter contained in the above description
10 or shown in the accompanying drawings is intended to be interpreted as illustrative and not in a limiting sense and that various modifications and variations of the invention may be constructed without departing from the scope of the invention defined by the following claims. For example, although the
15 snack dispenser of the preferred embodiment utilizes relatively inexpensive components, individual aspects of the invention could be utilized in combination with other more complex vending machines without departing from the scope of the invention. Thus, other possible variations and modifications should be
20 appreciated.

Furthermore, it should be understood that when introducing elements of the present invention in the claims or in the above

description of the preferred embodiment of the invention, the terms "comprising," "including," and "having" are intended to be open-ended and mean that there may be additional elements other than the listed elements. Similarly, the term "portion" should
5 be construed as meaning some or all of the item or element that it qualifies. Yet further, the term credit as used herein is meant to encompass the term debit.